Docket D.T.E. 02-38

Investigation by the Department of Telecommunications and Energy on its own Motion into Distributed Generation

Initial Comments of the Union of Concerned Scientists,
Massachusetts Energy Consumers Alliance,
Massachusetts Public Interest Research Group,
Conservation Law Foundation, Clean Water Action,
and The Environmental League of Massachusetts

August 1, 2002

We welcome this opportunity to submit comments to the Department of Telecommunications and Energy ("Department" or "DTE") regarding Distributed Generation in Massachusetts. These comments are submitted by the following organizations:

A. THE UNION OF CONCERNED SCIENTISTS

The Union of Concerned Scientists ("UCS") is an independent nonprofit organization of 50,000 citizens and scientists working for practical environmental solutions. For more than two decades, UCS has combined rigorous analysis with committed advocacy to reduce the environmental impacts and risks of energy. UCS' energy program focuses on encouraging the development of clean and renewable energy resources, such as solar, wind, geothermal and biomass energy, and on improving energy efficiency. Participating in the design and implementation of state renewable policies is one way UCS actively works toward these ends. UCS is interested in promoting the public interest, which is served by a reliable and efficient regional electricity market broadly defined. UCS is submitting the following comments in this proceeding because it represents interests that will be directly affected by the outcome of this proceeding.

B. MASSACHUSETTS PUBLIC INTEREST RESEARCH GROUP

The Massachusetts Public Interest Research Group ("MASSPIRG") is a statewide public interest organization with 50,000 members across the Commonwealth. MASSPIRG's mission to deliver persistent, result-oriented public interest activism that protects our environment, encourages a fair, sustainable economy, and fosters responsive democratic government. Since 1972, MASSPIRG has worked on a range of consumer and environmental issues including energy policy matters. In light of our mission and our many members who will be directly affected by the decisions made pursuant to this proceeding we represent a perspective that should be represented. MASSPIRG moves to comment in this investigation because it represents interests that will be directly affected by the outcome of this proceeding.

C. THE MASSACHUSETTS ENERGY CONSUMERS ALLIANCE

The Massachusetts Energy Consumers Alliance ("Mass Energy") is a 20 year old nonprofit organization with a dual mission of energy affordability and environmental sustainability. Mass Energy currently operates several energy programs, the largest of

which is the oil-buying network, which serves 7000 households in eastern and central Massachusetts, and allows members to save 15-30 cents per gallon on heating oil.

Mass Energy also actively promotes energy efficiency and renewable energy. In partnership with several other area organizations, Mass Energy is part of the Department of Energy's Million Solar Roofs program (visit SolarBoston.org). In November 2001, Mass Energy received funding from the Mass. Technology Collaborative and the John Merck Fund to develop a Green Power Consumer Aggregation. Mass Energy has fifteen partners in this effort, including the Boston Public Health Commission, Town of Brookline, City of Cambridge, City of Newton, Clean Water Action, Coalition on Environment and Jewish Life, Green Decade Coalition of Newton, Mass. Climate Action Network, Mass. Audubon Society, MASSPIRG, New Ecology, Inc., Sierra Club of Mass., Somerville Climate Action Network, and Tufts Climate Initiative. Mass Energy's goal is to work with these partners and others to launch a competitive green power offering by the end of 2002.

In addition to working directly in the market, Mass Energy will continue to advocate for policies that are pro-consumer and pro-environment.

D. CLEAN WATER ACTION ALLIANCE OF MASSACHUETTS

Clean Water Action is a national citizens' organization working for clean, safe and affordable water, prevention of health-threatening pollution, creation of environmentally safe jobs and businesses, and empowerment of people to make democracy work. Clean Water Action organizes strong grassroots groups, coalitions and campaigns to protect our environment, health, economic well-being and community quality of life. Clean Water Action is active is 25 states and has 700,000 members nationally. We represent 40,000 members in Massachusetts and have offices in Boston and Northampton, MA. One of Clean Water Action's major issues areas is the environmental impacts of electric power generation.

E. CONSERVATION LAW FOUNDATION

The Conservation Law Foundation works to solve the environmental problems that threaten the people, natural resources and communities of New England. CLF's advocates use law, economics and science to design and implement strategies that conserve natural resources, protect public health, and promote vital communities in our region. Founded in 1966, CLF is a nonprofit, member-supported organization. It has regional advocacy centers in Boston; Montpelier, Vermont; Concord, New Hampshire; Providence, Rhode Island and Rockland, Maine. CLF maintains an extensive website at www.clf.org. CLF was deeply involved in the restructuring of the electricity sector in Massachusetts and has long advocated for continued improvement in air quality from that sector. Most recently, CLF has focused on the threat of global warming and the need to deploy large scale renewable energy sources in order to address this threat. All of these concerns are implicated by the DG issues under review in this proceeding.

F. ENVIRONMENTAL LEAGUE OF MASSACHUSETTS

The Environmental League of Massachusetts, a 501(c)(3)/501(h) organization, is dedicated to protecting the air, water, and land for the people of the commonwealth. We do this by voicing citizens' concerns in both the executive and legislative branches of state government, advocating for strong environmental laws through organizing and work

with the press, ensuring that our laws are implemented and enforced through "watchdog" monitoring and reporting, and educating individuals and communities about environmental issues. Founded in 1898 as the Massachusetts Forestry Association, ELM has evolved into a watchdog and advocacy organization encompassing a myriad of environmental issues.

ELM was instrumental in the enactment of first-in-the-nation laws on toxics use reduction, wetlands and river protection, and acid rain prevention. In 1997, we helped to bring the varied voices of the environmental movement together in the Massachusetts Environmental Collaborative to advocate for common purposes, defending environmental spending, and promoting local investments in open space, housing, and historic preservation. The Environmental League staffs and coordinates the Collaborative, which has grown to include 55 organizations working on regional environmental issues, water resources, land conservation, and public health. We bring these member organizations to the Green Power Consumer Aggregation Project led by Mass Energy, and keep them apprised of developments on this issue in particular.

I Summary

These comments focus on four main areas relevant to this proceeding: coordination of energy and environmental policies, interconnection, distribution system planning, and other issues. This section provides a summary of these comments, and the sections below provide more detail on each point.

- ?? Coordination between economic and environmental goals is essential. Implementation of any DTE rules allowing "a thousand Distributed Generation ("DG") flowers to bloom" should wait until the DG Emissions Working Group process is complete and the Massachusetts Department of Environmental Protection ("DEP") has had an opportunity to translate that model rule into a Massachusetts regulation.
- ?? The DTE should work toward establishing simplified and standardized interconnection procedures. Such procedures are critical to achieving the market efficiency and reliability benefits that DG can offer. In particular, interconnection procedures should facilitate the installation of DG that provides substantial environmental benefits. Coordination with FERC's initiatives on interconnection could go a long way towards establishing standards that facilitate the promise of DG.
- ?? In order to spend ratepayer dollars most efficiently, distribution companies should be required to include DG in the investment options they consider in distribution system planning. These companies' review of DG should be carried out in a detailed and transparent way, which can be reviewed by interested parties. Wherever possible, this process should harness market forces, allowing DG to compete against other resource options.
- ?? Any procurement of DG by distribution companies on a load response (or other) basis must include a requirement that such DG come from sources with appropriate emissions characteristics.

?? The DTE should investigate implementing revenue cap rate regulation of Massachusetts distribution companies in order to ensure that cost recovery mechanisms for the distribution companies do not create a bias against load response and distributed generation.

?? The net metering regulation should be changed to allow credits for production in excess of consumption to carry forward beyond the current limit of one month.

II Background

Load response has the potential to provide both economic and reliability benefits. Economic load response – where electricity consumers modify their use of electricity in response to market prices – is critical to assuring that electricity prices reflect an efficient market. Additionally, peak load reduction through load response can reduce electricity costs for all electricity consumers. Emergency load response – where electricity consumers reduce their use of electricity when tight supplies threaten grid security – is an important tool for ensuring system reliability. DG can serve as a resource in both types of load response. In addition, load response promises long-run environmental gains through greater investment and innovation in energy conservation and load management, increased use of small-scale generators that produce little or no pollution, and improvements in the operation of electricity generators. In the short run, however, reliance on unmitigated and in some cases unregulated small diesel generators could result in high air emissions.

The Department's objective in opening this investigation is to inquire into the potential benefits and concerns associated with the expanded use of distributed generation in Massachusetts. Distributed Generation is not a new concept, but interest in DG has ballooned recently due to concerns over price volatility in wholesale markets and electric system reliability. Retail electrical competition and increased competition in wholesale markets have developed within a network of policies designed to improve the costs, reliability, and environmental impacts of electricity service in Massachusetts. This policy context was put in place by the 1997 Massachusetts legislation commonly known as the Restructuring Act, 1997 Mass Acts 164.

The Restructuring Act makes it clear that achieving environmental improvement was an important goal of restructuring. To that end, the Legislature included a number of policy initiatives in the Act that were designed to improve the environmental characteristics of the electricity sector. Examples of these policy initiatives include the Renewables Fund, the Renewable Portfolio Standard, the Energy Efficiency Systems Benefit Charge, and the Generation Performance Standard. In addition, the Legislature anticipated that customer choice itself would be a source of environmental improvement, and to that end included requirements for the disclosure of fuel source and emissions information to retail customers.

Beyond the Restructuring Act, Massachusetts has made a concerted effort to reduce the environmental footprint of the electricity industry. The complementary efforts of the Legislature, various Governors, the Department, DEP, industry, citizens, elected officials,

and advocacy organizations over the last decade have created a regulatory, technical, and economic framework for a dramatic reduction in air emissions from the power plants that supply electricity to the Commonwealth. Massachusetts recently adopted multi-pollutant output-based emissions standards for the most highly polluting power plants in the state.[1] This regulatory approach, where standards are based on the electrical output of a power plant rather than on its fuel input, is consistent with increased competition in the electric industry since it rewards increases in generation efficiency rather than fuel consumption. The multi-pollutant approach provides regulatory certainty and enables generators to develop comprehensive – rather than piecemeal compliance plans.

Given these hard won gains it would be tragic if we were to undermine our progress on addressing the environmental impacts of large power plants by opening the door to DG in a manner that did not adequately address critical concerns over air emissions, global warming, and energy efficiency. This is an important consideration since DG is likely to be an attractive option for customers and their suppliers, particularly as location-based pricing is implemented in New England, and system reliability continues to be a concern both at the transmission and distribution system levels.

The Department's implementation of certain policies (e.g. Information Disclosure), and coordination with other State agencies on other policies (RPS, GPS, and generation information system) highlights the interrelated nature of initiatives contained in the Restructuring Act. While the Department is not directly responsible for all of the Restructuring Act's environmental improvement policies, its decisions will affect the State's success in achieving those objectives. We recognize that in some instances reconciliation of different legislative mandates and restructuring provisions is difficult. However, we hope that in this and future dockets the Department will ensure that its policy decisions shaping the market will reflect and enhance the various policy objectives established by the Legislature in the Restructuring Act, and pursued by other state agencies and the Governor over the past decade.

III The Need for Coordination Between Distributed Generation Policies and Other State Policies (question 4)

The Department invited commenters to identify what other issues are appropriate for consideration in this investigation. We will respond to this question first because it provides essential context for our responses to other questions. It is essential that the DG decision-making and regulation by the Department be consistent with the state's environmental policy goals. In particular, the Department should coordinate its efforts with the regulation of emissions from DG by the Department of Environmental Protection ("DEP") in order to ensure that proliferation of DG does not undermine the critical environmental gains that have been a signal achievement of Massachusetts state government in recent years.

[1] 310 CMR 7.29

The emergence of a whole new fleet of high efficiency combined-cycle natural gas fired power plants has reduced and will continue to reduce emissions attributable to electricity generation as the older plants are displaced. Conservative estimates point to a reduction of 85 percent in Nitrogen Oxides (NO_x) and Sulfur Oxides (SO_x) emissions flowing from this shift in large-scale power production. The higher efficiency of these plants means that the power sector in New England and Massachusetts is seeing a striking reduction in emissions of Carbon Dioxide (CO_2), the main greenhouse gas causing global warming, a reduction approaching 45 percent.

The benefits of the Commonwealth's reliance on new more efficient technologies for large power plants could easily be eroded by an increase in electric generation by inefficient and high-emitting DG units. For example, the NO_x emission rates of the new combined-cycle units being sited in Massachusetts are in the range of 0.05 lb/Megwatthour ("MWh"). (The NO_x permits for several new plants are below this level.) A diesel-fueled generator with NO_x controls emits NO_x at a rate in the range of 1.5 to 2.0 lb/MWh – more than 30 times the rate of a new combined cycle unit. Moreover, diesel units emit significant quantities of particulate matter that carries known carcinogens, while new gas-fired power plants emit virtually none. In addition, while combined-cycle plants are required to have tall smokestacks to direct pollution away from citizens, diesel units often emit pollution (including particulates and toxics) in populated areas, right at "lung level." Thus, in the interest of protecting the health of the Massachusetts citizens, it is imperative that the Department's and DEP's policies regarding DG are consistent.

In the context of DG, the simplest and most effective way to address global warming and energy efficiency is to reward, through streamlined permitting and preferential rates, DG which uses combined heat and power to wring the maximum benefit from every unit of fuel consumed. A program of favoring Combined Heat and Power (CHP) is good energy policy, fostering higher efficiency, as well as good environmental policy. Later this summer the acting Governor of the Commonwealth will present our statewide Climate Action Plan at a meeting of the New England Governors and Eastern Canadian Premiers. Movement in this area should be a key element in her remarks at that meeting.

On the question of NO_x and SO_x, the Department should take three essential steps. First, the Department should set up an expedited permitting process for small and very clean DG, ensuring incentives for wind power units producing less than 100 kW, solar systems and fuel cells of this scale. Second, the Department should ensure that any procurement of DG by distribution companies on a load response (or other) basis include a requirement that such DG come from sources with appropriate emissions characteristics. For example, a program might require that such sources produce less than 0.30 lb/MWh of NO_x, substantially more than a new gas power plant but cleaner than many older sources.

Finally, the Department should delay implementation of key portions of any new rules, standards and rates flowing from this investigation until after DEP has completed its anticipated DG air emissions rulemaking. The Commonwealth has invested in the DG model rulemaking process being coordinated by the Regulatory Assistance Project by providing significant DEP staff input and assistance to that project. The final product of

that collaborative effort will be the foundation for this new DEP rulemaking, strongly suggesting that implementation of any DTE rules allowing "a thousand DG flowers to bloom" should wait until that process is complete and DEP has had an opportunity to translate that model rule into a Massachusetts regulation.

IV Interconnection policies are critical to the ability of clean DG to be competitive (questions 1.a and 1.b)

A lack of common interconnection procedures among distribution companies in Massachusetts and across the nation creates a barrier to distributed generation. The process a customer must go through in order to prove adherence to technical requirements can vary greatly from one distribution company to another and between states. For example, National Grid provides a one-page "Notice of Intent to Interconnect" followed by a two-page "Interconnection Service Agreement." By contrast, NSTAR requires the customer to "notify the Company in writing in accordance with the limits prescribed in 220 CMR 8.04" and to submit "a detailed single line diagram, stamped by an Engineer Registered to Practice in the Commonwealth of Massachusetts of its entire facility before any material is purchased." Such variations, and in the latter case a lack of clarity and higher costs to the consumer, become barriers in particular to the interconnection of small scale distributed generation projects, and to the development of DG technologies. The Department should require the distribution companies to use standardized interconnection procedures for DG. Ideally, interconnection policies would be consistent across the nation.

Standard interconnection requirements and procedures are critical for small generators because such generators typically have limited financial and technical ability to deal with cumbersome interconnection processes and little ability to deal with uncertainty and economic risk that current practices impose. We are particularly interested in this issue because most renewable energy generators that could serve as distributed generation resources fall into the small generator category of 2 MW or less. Thus we believe that standardized and streamlined interconnection procedures are essential for achieving economic as well as environmental policy goals. Without simple, inexpensive and expedited interconnection requirements, generators under 2 MW will be unable to participate in competitive markets and grid-connected customers will be unable to use these generators.

Our comments on this issue draw from comments recently submitted by a number of parties in FERC's proposed rulemaking on Interconnection Agreements and Procedures (Docket no. RM02-1-000).[2] The comments in the FERC's proposed rulemaking are applicable here because we believe that the same issues and principles apply to interconnection of DG under the jurisdiction of state energy regulatory bodies. We have

[2] E.g., "Joint Comments on the Interconnection NOPR of Multiple Public Interest Organizations," as well as comments submitted by the Solar Energy Industries Association et. al., and the Combined Heat and Power Association, et. al. June 17, 2002.

attached the “Joint Comments on the Interconnection NOPR of Multiple Public Interest Organizations” for your information.

Those comments urge FERC to adopt standardized interconnection procedures and agreements that are based on the interconnection model from Texas. The interconnection procedures recommended in the FERC proceeding are also appropriate for interconnection under state jurisdiction. Indeed coordination of interconnection policies under federal and state jurisdiction is essential to the successful integration of the DG resource into energy markets and transmission and distribution system functions. FERC’s decision in its interconnection procedures docket is forthcoming, and we recommend that the DTE should be careful to consider FERC’s decision before finalizing interconnection procedures in Massachusetts.

We prefer a national standard and we believe that FERC will create a workable framework for interconnection. However, should FERC’s decision be delayed significantly, or should it not provide sufficient specificity, we urge the Department to take steps to resolve the current untenable situation in Massachussets. It is important that new standards be in place by the end of 2002. The Massachusetts Technology Collaborative, through its "Solar to Market Initiative," "Green Buildings," and related programs, is supporting what will amount to a couple of hundred DG interconnections in the next two years - particularly for photovoltaics and fuel cells. Approximately half of those installations will be in the NSTAR territory. The MTC-supported installations will create a caseload far greater than anything that Massachusetts has ever experienced. It is important that the installations be handled appropriately to achieve the reliability, market efficiency, and environmental benefits of those installations.

Generating units less than 2 MW in size have a long history of safe and reliable operation. Texas, California, and the PJM states[3] have ample successful experiences with the incorporation of small units into the grid and we are urging the MA DTE to adopt similar procedures. Many generators of this size are packaged units that already contain within the unit all of the protective equipment needed for interconnection. These units can essentially “plug and play” and should not have to jump through lengthy and complicated interconnection hoops. System protection issues arise only where such small units constitute more than a small portion of a particular system (about fifteen percent of the peak load on the circuit).

In addition to streamlined interconnection procedures, we recommend the following:

- ?? No requirement for the DG unit to have an occupied control center network modeling of power flows, or unit commitment schedules. These are not applicable to small DG units.
- ?? Appropriate metering requirements such as: Hourly integrated meters for units below 2 MW but above 250 kW (as are used in PJM for certain small generators);

[3] The PJM Interconnection covers major portions or all of the states of Pennsylvania, New Jersey, Maryland, Virginia and Delaware, and the District of Columbia.

and other measuring technologies for generators below 250 kW (as have been approved in New York for the ISO load response program).

?? A low cost dispute resolution process.

In finalizing its interconnection approach, the DTE should coordinate with the Department of Environmental Protection ("DEP") to ensure compatibility between economic and environmental policy goals. With respect to interconnection policy, the Department could work with environmental regulators to ensure that streamlined interconnection procedures do not exacerbate environmental impacts, and are instead consistent with the environmental permitting procedures and new emissions standards that environmental regulators are establishing.

Finally, as recommended above, the DTE should also facilitate clean DG by requiring that distribution companies offer an expedited interconnection procedure for small generators that meet certain emission standards established by environmental regulators. For example, one of the simplest and most effective way to address global warming and energy efficiency is to reward, through streamlined permitting and preferential rates, DG which uses combined heat and power to wring the maximum benefit from every unit of fuel consumed. A program of favoring Combined Heat and Power (CHP) is good energy policy, fostering higher efficiency, as well as good environmental policy. Later this summer the Governor of the Commonwealth will present our statewide Climate Action Plan at a meeting of the New England Governors and Eastern Canadian Premiers- movement in this area should be a key element in her remarks at that meeting.

V Distribution system planning (questions 3.a and 3.b)

It is the role of the DTE to ensure that distribution companies spend ratepayer money in the most efficient way, and this means ensuring that these companies' planning methods evolve along with technology. Today, DG is increasingly being seen as a valuable resource in distribution system planning. DTE's responsibility here is to ensure that decisions about how and where DG participates are made in a way that keeps overall consumer costs as low as possible in order to enhance the economic competitiveness of the state. peak reduction bringing energy costs down be raised in this section. We strongly urge the DTE to require distribution companies to review the possible benefits of DG on their systems and to do this in a detailed and transparent way, which can be reviewed by interested parties. Wherever possible, this process should harness market forces, allowing DG to compete against other resource options.

V.1 Benefits of DG in the distribution system

Distributed resources ("DR"), which include DG as well as load management and energy efficiency, offer the opportunity to develop a more dynamic and versatile relationship between electricity demand, electricity supply, and the physical distribution system linking supply to load. The potential benefit of distributed resources rests on the technologies' ability to reliably displace peak loads on the transmission or distribution system at lower cost than the alternative of upgrading transmission or distribution system carrying capacity with capital investments in new transformers and conductors.

"Renewing Our Neighborhoods," a 1995 UCS report, estimated that distributed renewable resources could displace almost one-third of the annual peak demand for the then Boston Edison, service area. In addition, DR's value to system planning is that it can be installed on a modular basis over any period of time.

The economic benefit of DG is a function of the magnitude of the T&D investment deferred or displaced, the length of the deferment, and the cost of capital for the distribution company. Solutions to T&D constraints that are traditionally implemented by the distribution companies are almost certain to be suboptimal because they are made strictly based on the economics of a narrow set of wires-only options (i.e. increasing transformer or conductor sizes, reconfiguring feeders, etc.), disregarding the extra value (i.e. bill savings, enhanced reliability, etc.) of onsite generation, load management, or energy efficiency. Incorporating DG into the distribution system planning process would enable a more market-based approach to resolving constraints and reliability problems on the distribution system. In addition, it would be consistent with recent FERC policy regarding the inclusion of generation and demand-side options in transmission system planning.

In addition to the economic and reliability benefits, DG can provide significant environmental benefits. One issue that is often raised about renewable DG resources is their intermittent nature. However, while these resources may not be optimal for providing the reliable, local peak reduction that is essential to mitigating congestion on the distribution system, they can be part of a load pocket solution, along with other distributed resources, such as demand-side management, natural-gas fuel cells, and biomass fueled sources. Intermittent resources may also be able to participate in a solution if a thorough statistical description of the intermittent resources is developed that gives distribution companies the data they need to accurately assess the contribution of these resources to local peaks. Both of these approaches may be viable. It is critical to recognize that in some cases local demand is highly correlated with the availability of renewable sources of supply. For example the National Renewable Energy Laboratories have performed analyses indicating that solar energy is readily available in many areas of the United States (including the Northeast) at peak demand times.

Many research papers on this topic, too numerous to cite here, are available at http://www.clean-power.com/research.htm. Many of these papers, written by such authors as Christy Herig, Dan Shugar, Howard Wenger, are based on case studies of photovoltaic installations. For example, Mr. Shugar has done extensive studies of the distribution system benefits of PV at PG&E's Kerman Substation. In one case study, Mr. Shugar carefully defines both the nature of the PV resource and the specific engineering needs of the distribution system. This approach yields a quantified and defensible assessment of the T&D benefit of this intermittent generator.[4]

There is evidence that DSM, including energy efficiency and load management, is valuable as an integral component in transmission and distribution system planning. For example, in California a DSM initiative, relying primarily on energy efficiency, was used

[4] D.S. Shugar and T. Hoff, Progress in Photovoltaics, Research and Applications 1:233-250 (July 1993).

to reduce investment in local transmission and distribution, producing substantial cost savings to a utility and its customers.[5] This case study relied primarily on energy efficiency in residential air-conditioning and lighting applications, with a secondary reliance on energy efficiency in commercial applications. This integrated approach was undertaken to determine how best to serve fast-growing demand in a suburban area of California.

In testimony to the California Public Utilities Commission, Pacific Gas and Electric Company (PG&E) identified certain types of distribution system capacity needs where distributed resources may be a cost-effective solution.[6] For example, PG&E identifies certain generic circumstances under which DG is likely to be cost effective (PG&E Phase 1 testimony, chapter 2 at 24-25). Such circumstances include: (a) minimal load growth with consistent seasonal peak demand; (b) small increases in demand that do not warrant lumpy wires solution; (c) geographically remote locations; or (d) time period too short for wires solution. In addition, there may be circumstances under which the available lead-time offers an opportunity to explore DR options. For example, PG&E states that final decisions to implement capacity projects are typically made 2 years prior to the in-service date on substation expansions, 1 year prior on circuit modifications (PG&E Phase 1 testimony at 24).

Consistent with this focus on ensuring compatibility between efforts to achieve economic goals and environmental policy goals, it is important to note that distribution system planning offers an opportunity for policy coordination to use public funds to achieve public goals. For example, distribution system planning can be a tool for focusing renewable fund expenditures. Specific pilot programs can be used to begin the development of infrastructure to support the deployment of clean DG that enhances the distribution system.

V.2 Identifying DG needs

DG resources have the ability to solve problems for certain load pockets, under the right conditions. At the distribution feeder level, upgrades to transformers and conductors come in increments of 1 to 20 MW depending on the feeder and substation. (DG with aggregate capacity in this same 1 to 20 MW range is often required). DG needs will be case specific, area and time specific, and may change over time. The DG source does not need to meet the entire load of an area to defer planned distribution capacity. In fact, the maximum DG capacity that would be needed to defer capacity in *all* high cost areas would be less than 10 percent of the total existing load.[7]

As a general matter, the Boston area appears to provide a significant opportunity for deployment of DG and other distributed resources both due to the recent poor

[5] Ren Orans, Chi-Keung Woo, and Brian Horii, *"Case Study: Targeting Demand-Side Management for Electricity Transmission and Distribution Benefits, Managerial and Decision Economics,"* Vol. 15, 169-175, 1994.
[6] PG&E Testimony on Distribution Company on Distribution Company Rate Design, CPUC Rulemaking 99-10-025, Phase I.
[7] Joel Swisher, *"Clean Energy, Greener Profits,"* 2002.

performance of the distribution system, and to the likely higher prices that the area is likely to experience under location-based marginal pricing ("LBMP"). The NSTAR companies have undertaken a comprehensive study of the distribution system in this area, and submitted the report to the Department of Telecommunications and Energy in October 2001. Information such as provided to by NSTAR to their consultants, ABB, for the preparation of its report could be useful in a transparent distribution system planning process such as discussed below. In addition, other areas characterized by high load growth could be good candidates for deployment as well as for targeted energy efficiency initiatives in order to reduce the growth of peak demand on the transmission and distribution system.

Distribution system reliability reports to the Department, as well as reporting requirement under performance-based ratemaking plans can provide useful first-level information about potential areas of distributed resource deployment in distribution company service territories. However, clearly distribution companies have the most comprehensive information on specific weak links in their system. In general, that data is not publicly available. Determining the amount of DG to install requires a transparent planning process such as discussed below.

V.3 The transparent planning process

To capture the benefits discussed above, distributed generation and other distributed resources options (such as energy efficiency and load management) should be incorporated into both transmission and distribution planning. Many of the economic benefits described above would actually accrue to customers through savings in distribution system costs. Therefore, some form of cooperative partnership with the utility is essential to capture this value. Furthermore, DG must be incorporated in a transparent way that permits review and input from a variety of interested parties. Simple assurances from distribution or transmission companies that distributed resources are considered are not sufficient.

A transparent planning process can reveal how distributed resources should be incorporated into the distribution system, and allow an opportunity for competitive forces and customer actions to maximize the benefits of distributed generation to customers of the distribution system where feasible. A transparent process will establish clear understanding and expectations for stages of the planning process, frequency of the process, opportunity for participation in the process, and what information will be available to stakeholders. Furthermore, it will be extremely difficult to determine the least cost resource in the absence of information regarding the costs of alternative solutions available at the time.

ISO New England has begun to develop a transparent transmission planning process in its Transmission Expansion Advisory Committee (TEAC). This committee, composed of a broad ranging group of interested parties and stakeholders, meets regularly to review and discuss the transmission planning process in New England. TEAC forms the basis for a planning process under consideration in the potential merger between ISO New England and the New York ISO. In fact, the proposed New England/New York planning process

reflects an even more comprehensive approach, anticipating the consideration of wires solutions, generation solutions, and load-side solutions (i.e. distributed resources) on an even footing. The DTE should initiate such planning committees at the distribution level also.

There are a variety of ways that a transparent distribution system planning process could incorporate and foster use of renewable distributed generation and other distributed resources (such as energy efficiency and load management). At a minimum, the process should identify areas on the distribution system where forecasted load patterns could require upgrades or system expansion. Key steps in an appropriate planning process would include: (1) identifying and quantifying scale (MW) value, location, and timeframe of constraints; (2) defining the performance requirements for DG to meet the distribution system needs (i.e. time of day, time of year and other conditions driving constraint, minimum Distributed Resource (DR) capacity required); (3) communicating constraint information and sharing value of distributed resources with market participants; (4) providing market participants having the resources and pre-screened DG options sufficient opportunity to respond in an appropriate timeframe. The DTE should require that distribution companies use a combination of competitive solicitations, locational credits, and designation of "development zones" to spur solutions to an identified constraint that poses a reliability or market efficiency problem on the distribution system.[8]

Two of these options require further explanation, as they are relatively new concepts in distribution system planning.[9] Locational credits require that a distribution company identify certain areas of its distribution system requiring where existing distribution system capability is not sufficient to meet forecasted loads. The distribution system needs could be defined by location, time of constraint, and capacity (including operational characteristics). The distribution company would offer payments for deployment of distributed resources to address system constraints in the identified area. The payments would be determined based on factors including the projected cost of distribution system upgrades, avoidable maintenance costs, outage costs, and/or distribution system losses.

Another option would be for the distribution company to designate certain "distributed resource development zones." These zones would be an early response mechanism to address hot spots in the distribution system where reliability or market efficiency is likely to be jeopardized. Within these zones the distribution company could encourage distribution system customers to deploy distributed resources. Offering in kind assistance, including educating customers, and facilitating contracting, would be a low cost way for the distribution company to take early preventive action. In fact, ISO New England has combined these approaches in addressing transmission constraints in

[8] David Moskovitz, Regulatory Assistance Project, *Profits and Progress Through Distributed Resources*, Report to the National Association of Regulatory Utility Commissioners, February 2000.

[9] See, e.g. Testimony of Bruce E. Biewald on Distribution Company Rate Design, CPUC Rulemaking 99-10-025, Phase II, on behalf of The Utility Reform Network, Utility Consumers Action Network, and the Natural Resources Defense Council. July 3, 2000.

Southwest Connecticut, Northeast MA and Vermont for the summer of 2002. In this instance, ISO New England is offering location-based incentives through the load response program for the installation of distributed generation and other load response mechanisms. In addition, ISO New England issued a special RFP for Southwest Connecticut to provide cost-based load response and generation resources above and beyond the traditional load response.[10]

Such a multi-faceted approach to distribution system planning is likely to produce solutions that rely on a variety of technologies including distributed generation, customer load response, and more traditional "wires" solutions. It is not necessary to develop a process that would create excessive regulatory review and potential opportunities for delay. A transparent planning process, that establishes clear expectations for frequency of system reviews, public information, and a process for third parties to offer competitive services to meet identified needs will minimize the need for regulatory intervention. Furthermore, such a transparent planning process can ensure that ratepayer funded distribution system investments are consistent with existing state policies and initiatives to promote renewables (including the renewable portfolio standard, systems benefits charge goals, and the renewables fund administered by the Massachusetts Technology Park Corporation).

V.4 Lessons from other states

There are several other states considering how to incorporate distributed generation into distribution system planning. For example:

- Vermont: There is an on-going collaborative process including utilities, the Department of Public Service, and other stakeholders. The results of this collaborative process are expected in late summer or early fall 2002. The DTE should review the results as soon as they are available.
- California: The CA PUC has an on-going proceeding (R99-10-025). In addition, the California Energy Commission ("CEC") issued a "Distributed Generation Strategic Plan" in June 2002. We are pleased with the comprehensive and thoughtful approach to DG taken by the CEC in this proceeding. A strategic plan on distributed generation would also be appropriate in Massachusetts to ensure that distributed generation is deployed to maximum benefit in achieving economic and environmental policy goals. Such a strategic plan could accelerate the commercialization and mass adoption of fuel cells, PV, and cogeneration, and would ensure the use of innovative options to meet both economic and environmental policy goals.

In addition to looking to other states, it is useful to consider experiences from Europe. In Europe, distributed generation is deployed at much more aggressive levels than it has been to date in the United States.[11] Evidence from Europe indicates that high levels of

[10] Unfortunately from an environmental standpoint, for summer 2002 this RFP will result in the use of some mobile diesel-fueled distributed generation. Nevertheless, it illustrates the potential uses of an RFP to target transmission and distribution system issues in specific geographic areas.

[11] Source of information and cites regarding European experience: Thomas Ackermann, Royal Institute of Technology, Department of Engineering – Electric Power Systems, Stockholm Sweden.

DG deployment are feasible within a transmission and distribution system, and that there is no inherent limit to the amount of DG it is possible to integrate into a transmission and distribution system. Denmark has co-generation penetration level of 50% and an average wind penetration level of 20%, almost all of it interconnected at the distribution system level.

In the United States, the Department of Energy is undertaking research and development through its Distributed Power Program to investigate the integration of additional distributed resources into existing systems. This research focuses on a variety of facets of interconnection and integration issues.

Decisions about how to balance the benefits of distributed generation against the potential distribution system costs are policy decisions. They should be made within state government policy proceedings rather than within the closed company planning processes. A transparent distribution planning process would rely to a greater extent on competitive forces to address identified system needs. In such a process distributed generation and other distributed resources would be able to compete against wires solutions to provide the optimum solution. Currently, market forces cannot be brought to bear because the distribution companies hold all the cards. However, we urge the Department to use the policy tools at its disposal to facilitate progress in this area.

VI Other Issues

VI.1 Distribution Company Regulation

While the issue of distribution company regulation is much broader than the scope of this inquiry, it has crucial impacts on DG, as well as on other important energy policy goals such as energy efficiency. For some time, regulators have understood that regulation by setting prices puts a rational distribution company in opposition to energy conservation efforts. Similarly, DG installed on the customer's side of the meter reduces utility sales and revenues. Until the link between sales volume and revenue is broken, distribution companies will be ambivalent at best about both energy efficiency and DG. Performance Based Regulation (PBR) is one effective way to break this link.

The defining feature of PBR is the establishment of performance parameters that are used to determine distribution company revenues. These parameters usually include the frequency of non-weather-related outages, response time to outages, worker safety, and other customer service metrics. These parameters are built into a relatively simple equation that results in increasing revenues as performance in these areas improves, and decreasing revenues as performance deteriorates. The equation usually also includes factors to adjust for inflation and to apply constant pressure for increasing efficiency and productivity.

Two types of PBR have received the most attention in recent years: price-cap and revenue-cap regulation. Of the two, only revenue-cap regulation breaks the link between sales volume and revenues. Under price-cap PBR, rates are, in effect, fixed for a given period, and the company's revenues are determined by its performance in the targeted

areas and the amount of electricity sold. In contrast, under revenue-cap PBR, prices are adjusted each year based on the distribution company's actual revenues versus the revenue requirement. If actual revenues fall short of the revenue requirement, prices are raised in the following year to make up the difference. If actual revenues exceed the requirement, prices are lowered in the following year. In addition to this adjusting mechanism, the company is rewarded or penalized based on performance in the targeted areas.

We strongly urge the Department investigate implementing revenue cap regulation of Massachusetts distribution companies in order to ensure that cost recovery mechanisms for the distribution companies do not create a bias against load response and distributed generation. In short, PBR links utility revenues to the areas in which we want today's distribution companies to excel – that is providing electricity services, not simply delivering kilowatthours.

VI.2 Standby and Back-up Charges

Standby and back-up charges imposed by the distribution utility can be a huge deterrent to DG. In some jurisdictions, these charges take the form of substantial dollar per kWh levies based on the energy production of the customer¹s own on-site generator. These tariffs are typically developed to protect utilities from net revenue loss exacerbated by our current rate structures. Today¹s tariffs recover most of their revenue through charges based on kilowatt-hours, that is energy flow rather than capacity. DG installations create savings for the distribution companies but these savings are a function of the capacity that on-site generators reliably reduce. This mismatch can create a perverse disincentive, discouraging facility managers from installing distributed generation systems that are cost-effective from society¹s perspective.

DTE should consider the issues of balancing the value of DG to the distribution utility against the revenue reductions artificially created by antiquated tariffs. These issues are not intractable as there is room for a win-win-win situation where 1) distribution companies benefit in reduced costs in proportion to the revenue they lose under their tariff structures; 2) DG owners receive far value for both the energy that they produce and the capacity that they provide; and 3) society is empowered to deploy CHP and renewable technologies that reduce the environmental impacts of our power system.

VI.3 Net Metering

Current law requires distribution companies to allow for net metering of qualifying distributed generation for installations of no more than 60 kW. This is both arbitrary and a significant barrier to distributed generation. In large buildings, a 60 kW system, particularly a PV system, would only provide a small percentage of a building's load. In those cases, a building owner should be allowed to avoid the full delivered cost of electricity. With the current policy, large-scale PV installations, on-site wind turbines, and fuel cells that have potential to curb congestion and load problems with clean DG will always be undervalued. This is unfortunate because there are economies of scale to be had by installing large systems.

In addition, current net metering regulations, 220 CMR 11.04, call for a monthly settlement for customer generation. The regulation should be changed to allow credits for production in excess of consumption to carry forward indefinitely. Situations in which production exceeds consumption for an entire month are and will be rare.

VII Communications

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